

Non-Provisional Utility Patent Application

Inventor: Herbert L. Stone

Serial Number: Unassigned

Filing Date: May 10, 2004

Title: "METHOD FOR IMPROVED VERTICAL SWEEP OF OIL RESERVOIRS"

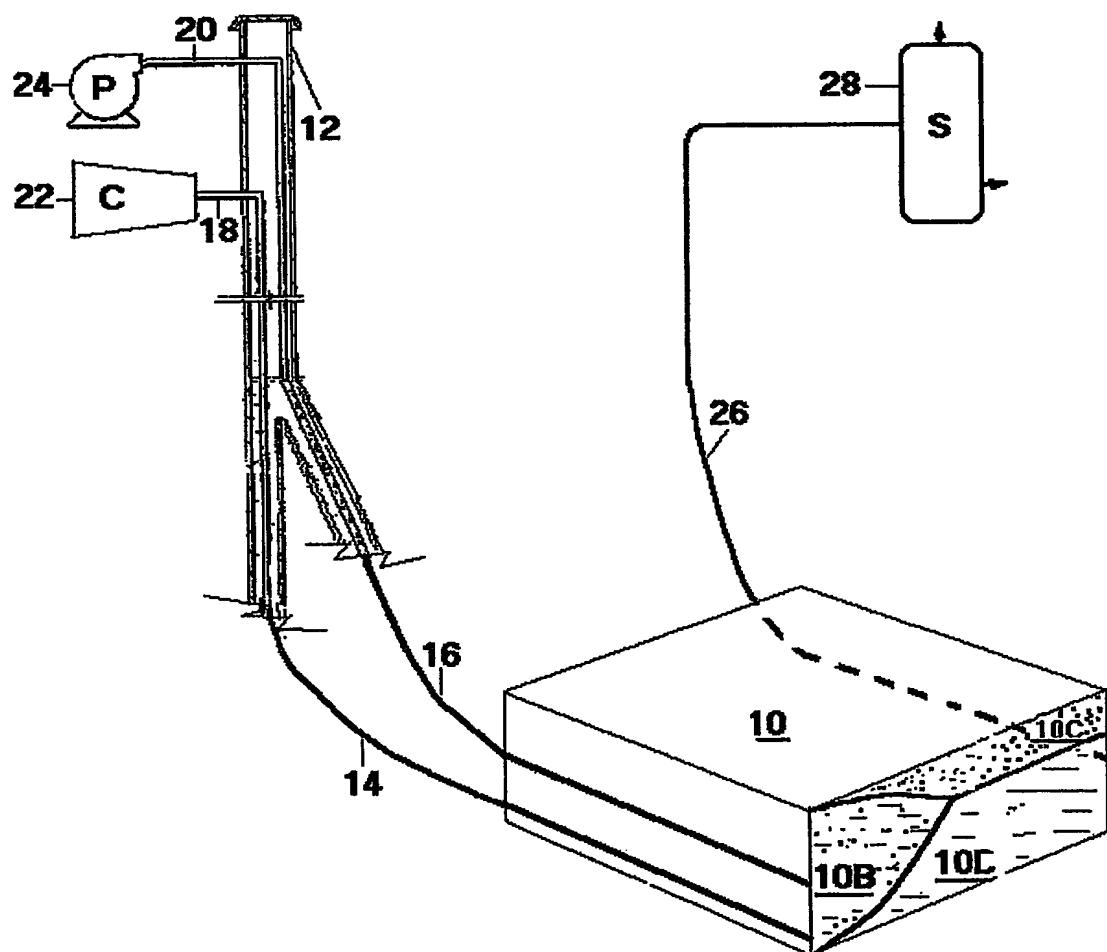
Contact: HERBERT L. STONE, 713-965-9544, stonehl@hal-pc.org

Drawing Sheet 1/10

Express mail Number: ER 886986390 US

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FIG. 1.
HORIZONTAL WELL APPLICATION IN A PATTERN ELEMENT



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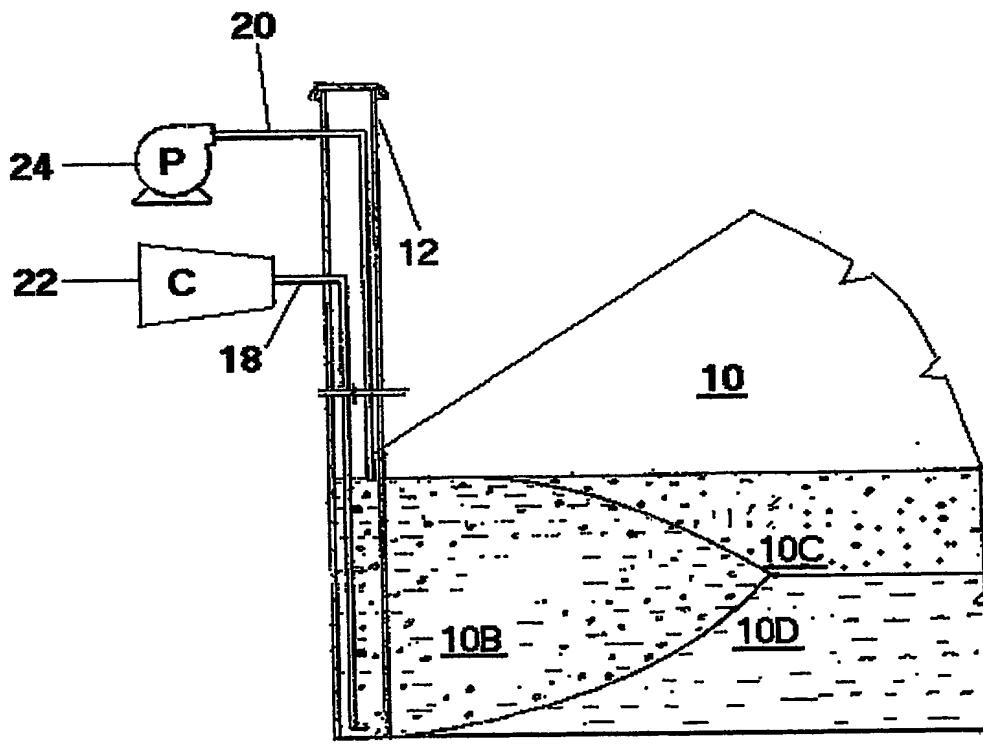
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FIG. 2.
VERTICAL WELL APPLICATION
IN A PATTERN ELEMENT



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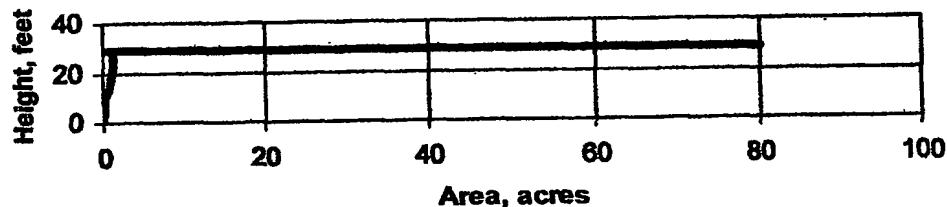
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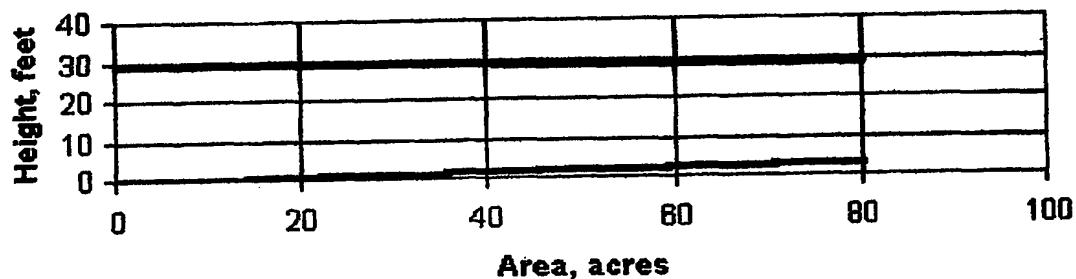
FIG. 3.
LOCATION OF MIXED FLOW ZONE FOR
CONVENTIONAL WAG, 29 FOOT FORMATION



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FIG. 4.
LOCATION OF MIXED FLOW ZONE, ENHANCED
DESIGN, 29 FOOT THICK FORMATION



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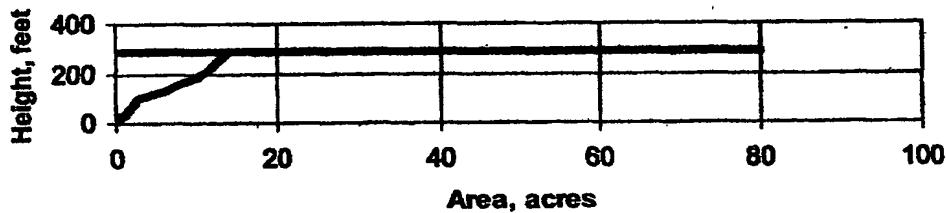
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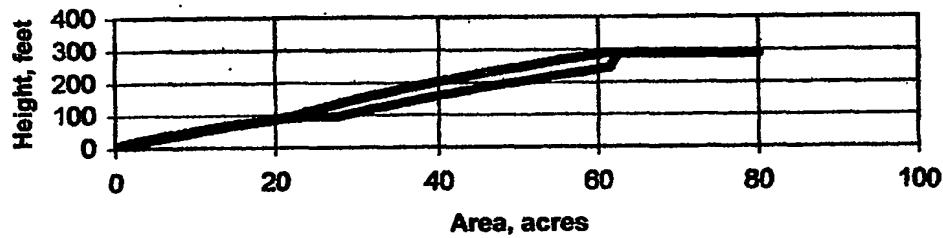
FIG. 5.
LOCATION OF MIXED FLOW ZONE FOR
CONVENTIONAL WAG, 290 FOOT FORMATION



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FIG. 6.
LOCATION OF SECOND FLUID FINGER WITH 100%
WATER INJECTION INTO TOP

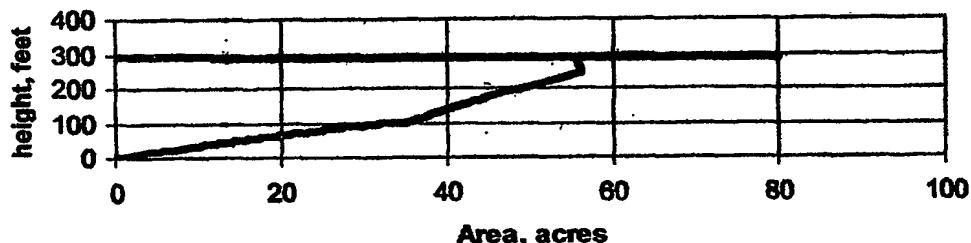


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FIG. 7.
**LOCATION OF MIXED FLOW ZONE FOR
BALANCED INJECTION**



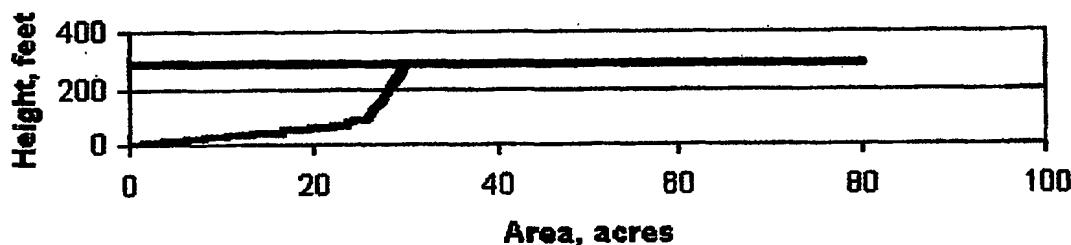
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Express mail Number: ER 886986390 US**FIG. 8.**
LOCATION OF MIXED FLOW ZONE FOR TOO
HIGH A DRAIN OFF RATE

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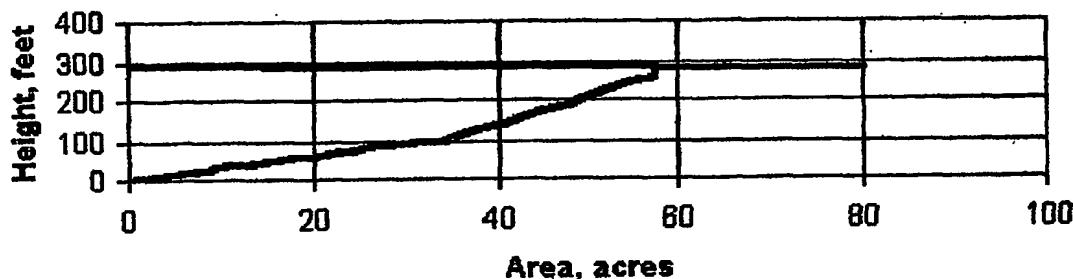
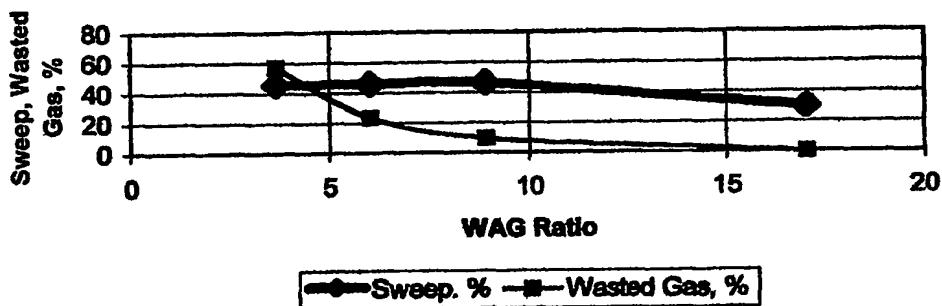
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FIG. 9.**LOCATION OF MIXED FLOW ZONE WITH EXCESS
SECOND FLUID INJECTION****FIG. 10.
WAG RATIO SELECTION**

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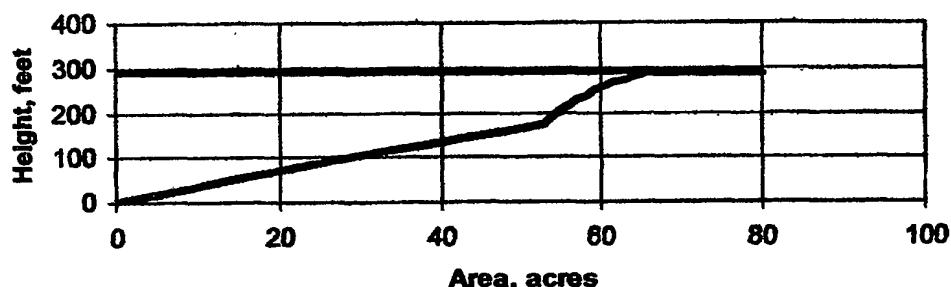
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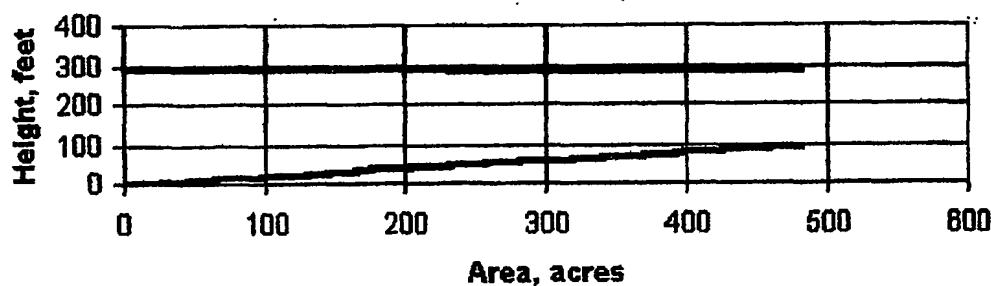
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FIG. 11.
Permeabilities Reversed from FIG. 9 Formation

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FIG. 12.
**HORIZONTAL WELLS, 480 ACRE SPACING,
MAXIMUM INJECTION RATE**

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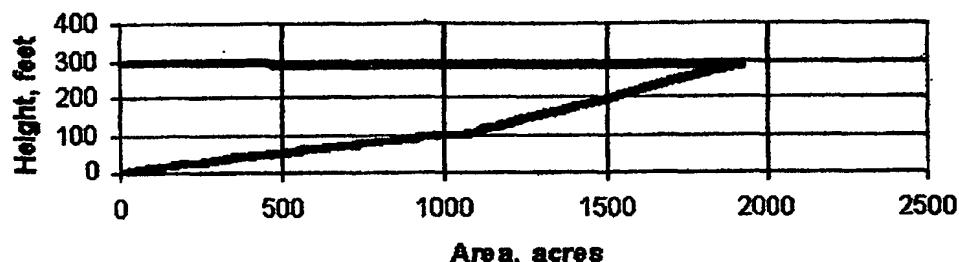
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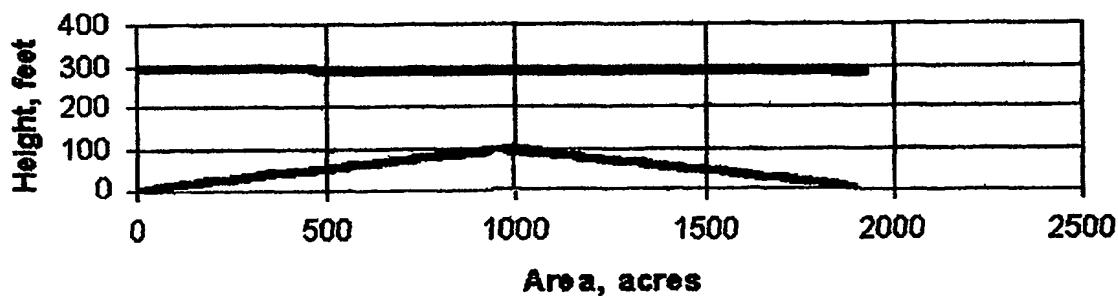
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FIG. 13.**Location of Mixed Flow Zone, Horizontal Wells,
1,920 Acre Spacing, Maximum Injection Rate**

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FIG. 14.**TWO-WAY FLOW, HORIZONTAL WELLS,
1,920 ACRES, MAXIMUM INJECTION RATE**

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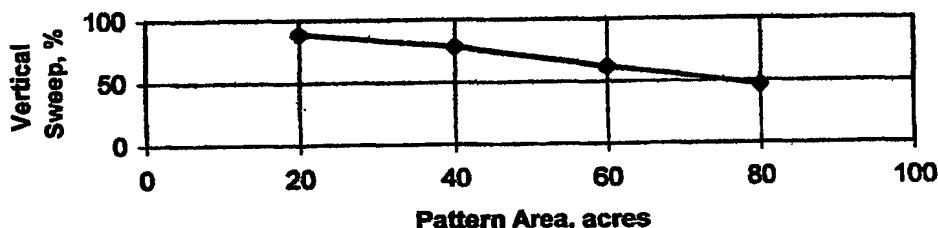
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FIG. 15.**SWEEP VERSUS PATTERN AREA, VERTICAL
WELLS, MAXIMUM RATE****FIG. 16.****SWEEP VERSUS PATTERN AREA, MAXIMUM
INJECTION RATE**